Statewide Guaranteed Engineering Transfer Pathways Endorsement Survey - Associate of Science

Background

Ohio Revised Code 3333.16(C) calls for the Chancellor of the Ohio Department of Higher Education to update and implement the policies and procedures by not later than December 1, 2018 to ensure that any associate degree offered at a public institution of higher education may be transferred and applied to a bachelor degree program in an equivalent field at any other public institution of higher education without unnecessary duplication or institutional barriers.

The Ohio Articulation and Transfer Network (OATN) has been working with faculty content experts from Ohio's two- and four-year public institutions of higher education since Fall 2017 to develop statewide guaranteed Transfer Pathways in Engineering. This survey includes the proposed pathways for the following majors:
1. Computer and Electrical Engineering
2. Aerospace, Agricultural, and Mechanical Engineering
3. Civil Engineering

The following survey questions will ask if you agree with the proposed pathways developed by the Engineering faculty panel.

Only one representative from each institution should complete the survey for each of the proposed pathways. However, the survey can be completed multiple times to address each of the three proposed pathways separately. This institutional response should be coordinated through the Provost's Office.

Please complete the survey as soon as possible but **no later than Friday, February 5, 2021.**

We will be hosting a webinar on Friday, January 29 from 12:00 PM to 1:00 PM to address any questions regarding this endorsement survey. The link to join the webinar is https://oh-tech.webex.com/oh-tech/j.php?MTID=mda69d3499699123065e5683627646611.

If you are unable to attend or have additional questions, please contact Dr. Candice Grant, Director of the Ohio Guaranteed Transfer Pathways, at cgrant@highered.ohio.gov.

* 1. Please provide your contact information:

Name:

Institution:

Title:

Email Address:

Phone Number:

* 2. For which pathway are you providing feedback/endorsement?

- ◯ Computer and Electrical Engineering
- ◯ Aerospace, Agricultural, and Mechanical Engineering
- ◯ Civil Engineering
- ◯ Do not offer these programs (universities) or will not offer an engineering transfer pathway (community colleges)

Computer or Electrical Engineering

The Engineering Panel proposes the following pathway for an Associate of Science degree leading into a bachelor's degree program in Computer or Electrical Engineering:

Computer/Electrical Engineering Page 1

Ohio TRANSFER TO DEGREE guarantee

Guaranteed Transfer Pathways

Statewide

Computer or Electrical Engineering

Associate of Science

January 4, 2021

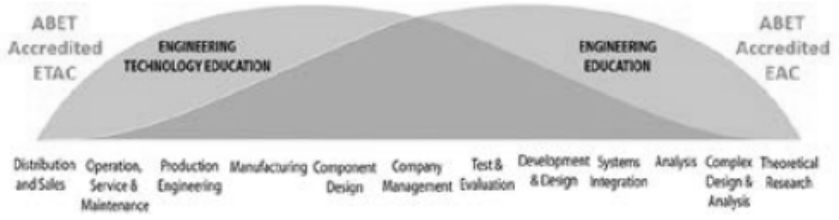
"Engineering and engineering technology are separate but closely related professional areas that differ in:

• Curricular Focus – Engineering programs often focus on theory and conceptual design, while engineering technology programs usually focus on application and implementation. Engineering programs typically require additional, higher-level mathematics, including multiple semesters of calculus and calculus-based theoretical science courses, while engineering technology programs typically focus on algebra, trigonometry, applied calculus, and other courses that are more practical than theoretical in nature.
• Career Paths – Graduates from engineering programs are called engineers and often pursue entry-level work involving conceptual design or research and development. Many continue on to graduate-level work in engineering. Graduates of four-year engineering technology programs are called technologists, while graduates of two-year engineering technology programs are called technicians. These professionals are most likely to enter positions in sectors such as construction, manufacturing, product design, testing, or technical services and sales. Those who pursue further study often consider engineering, facilities management, or business administration.

There is much overlap between the fields. Engineers may pursue MBAs and open their own consulting firms, while technologists may spend their entire careers in design capacities."

This pathway includes a combination of Associate of Science (AS) and Associate of Applied Science (AAS) coursework. It should result in students earning an AS degree. Some bachelor-degree granting programs may be competitive and admission into the program is not guaranteed. Students should check with individual institutions for their program admission requirements.

Some bachelor-degree granting institutions require additional general education courses outside of the Ohio Transfer Module and students may be required to take these courses in their junior or senior year. Additionally, students should be aware that certain Engineering programs require more than four semesters full-time to complete due to special requirements such as co-op for both transfer and non-transfer students.



Sources: Definition comes from the Accreditation Board for Engineering and Technology (ABET) (http://www.abet.org/accreditation/new-to-accreditation/engineering-vs-engineering-technology/), and the graphic comes from the American Society of Mechanical Engineers (ASME)

Ohio TRANSFER TO DEGREE guarantee

Guaranteed Transfer Pathways

Statewide

Computer or Electrical Engineering

Associate of Science

January 4, 2021

GENERAL EDUCATION REQUIREMENTS/OHIO TRANSFER MODULE		Credit Hours
ENGLISH COMPOSITION AND ORAL COMMUNICATION:		3
* Course 1:	First Writing (TME001) course	3
MATHEMATICS, STATISTICS, AND LOGIC:		4-5
* Course 1:	Calculus I (TMM005)	4-5
ARTS AND HUMANITIES:		6
+ Course 1:	Any OTM approved Arts and Humanities course	3
+ Course 2:	Any OTM approved Arts and Humanities course	3
SOCIAL AND BEHAVIORAL SCIENCES:		6
* Course 1:	Microeconomics (OSS004)	3
Course 2:	Introduction to Psychology (OSS015)	3
NATURAL SCIENCES:		8-10
Course 1:	Calculus-based Physics I (OSC016)	4-5
Course 2:	Calculus-based Physics II (OSC017)	4-5
ADDITIONAL CREDITS:		10-11
Course 1:	Calculus II (TMM006)	3
Course 2:	Public Speaking (OCM013), Oral Communication, or Second Writing (TME002) course	3
Course 3:	General Chemistry I (OSC008)	4-5
GENERAL EDUCATION/OHIO TRANSFER MODULE TOTAL:		37-41

Advising Notes:
Where it indicates "Any OTM approved," students should work closely with their advisors.
(*) indicates that the course simultaneously satisfies general education and business core requirements.
(+) indicates that the courses chosen should be from two different areas within that category.
A prerequisite such as College Algebra (TMM001) may be needed for a student to reach Calculus I (TMM005).

Ohio TRANSFER TO DEGREE guarantee

Guaranteed Transfer Pathways

Statewide

Computer or Electrical Engineering

Associate of Science

January 4, 2021

PRE-MAJOR/BEGINNING MAJOR		Credit Hours
Course 1:	Digital Logic (OET002)	3
Course 2:	Programmable Logic Controllers (OET022)	3
Course 3:	Engineering Statistics (OES004)	3
PRE-MAJOR/BEGINNING MAJOR TOTAL:		9

OTHER RECOMMENDATIONS		Credit Hours
Course 1:	Calculus III (OMT018) and/or Elementary Linear Algebra (OMT019)	3-9
Course 2:	Elementary Differential Equations (OMT020)	3-4
Course 3:	Electives (as needed)[1]	3
OTHER RECOMMENDATIONS TOTAL:		9-16

Advising Notes:

[1] Additional recommended pre-major/major coursework is institution specific and might include a course in programming. Requirements may vary by institution. Consult with your academic advisor and your receiving institution to determine an appropriate program of study.

ASSOCIATE DEGREE	Total Credit Hours
ASSOCIATE DEGREE TOTAL:	60-65

* 3. Do you endorse the proposed Statewide Guaranteed Computer and Electrical Engineering Transfer Pathway?

Please note that as an Associate of Science degree, students will complete the Ohio Transfer Module prior to transfer. Recognizing that certain engineering bachelor's degree programs take native students longer than 4 semesters with full-time enrollment, the expectation for completion should be similar, although not necessarily identical, for transfer students who complete this pathway.

For community colleges, if your institution intends to offer this pathway but does NOT offer one of the courses included in the pathway, students at your institution will need to take the course at a different institution via online or a course sharing option. Also, a student would need to be able to complete your Associate of Science degree, with the inclusion of certain technical coursework (Engineering Technology TAG courses).

- ◯ Yes
- ◯ No

Comments:

4. **For bachelor's degree programs only:** What upper level mathematics coursework do you require for computer and/or electrical engineering?

5. **For bachelor's degree programs only:** Which of the following TAG mathematics courses would you accept in fulfillment of the upper level mathematics requirements listed in your response to Question 4, either as the exact requirement or as a substitute for the requirement? Learning outcomes for these TAG courses are available here. (Check all that apply.)

- ☐ OMT018 (Calculus III)
- ☐ OMT019 (Elementary Linear Algebra)
- ☐ OMT020 (Elementary Differential Equations)

Comments

Aerospace, Agricultural, and Mechanical Engineering

The Engineering Panel proposes the following pathway for an Associate of Science degree leading into a bachelor's degree program in Aerospace, Agricultural, or Mechanical Engineering:

Aero/Ag/Mech Engineering Page 1

Ohio TRANSFER TO DEGREE guarantee

Guaranteed Transfer Pathways

Statewide

Aerospace, Agricultural, or Mechanical Engineering

Associate of Science

January 4, 2021

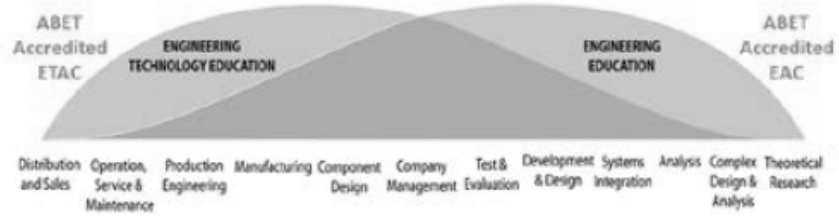
"Engineering and engineering technology are separate but closely related professional areas that differ in:

• Curricular Focus – Engineering programs often focus on theory and conceptual design, while engineering technology programs usually focus on application and implementation. Engineering programs typically require additional, higher-level mathematics, including multiple semesters of calculus and calculus-based theoretical science courses, while engineering technology programs typically focus on algebra, trigonometry, applied calculus, and other courses that are more practical than theoretical in nature.
• Career Paths – Graduates from engineering programs are called engineers and often pursue entry-level work involving conceptual design or research and development. Many continue on to graduate-level work in engineering. Graduates of four-year engineering technology programs are called technologists, while graduates of two-year engineering technology programs are called technicians. These professionals are most likely to enter positions in sectors such as construction, manufacturing, product design, testing, or technical services and sales. Those who pursue further study often consider engineering, facilities management, or business administration.

There is much overlap between the fields. Engineers may pursue MBAs and open their own consulting firms, while technologists may spend their entire careers in design capacities."

This pathway includes a combination of Associate of Science (AS) and Associate of Applied Science (AAS) coursework. It should result in students earning an AS degree. Some bachelor-degree granting programs may be competitive and admission into the program is not guaranteed. Students should check with individual institutions for their program admission requirements.

Some bachelor-degree granting institutions require additional general education courses outside of the Ohio Transfer Module and students may be required to take these courses in their junior or senior year. Additionally, students should be aware that certain Engineering programs require more than four semesters full-time to complete due to special requirements such as co-op for both transfer and non-transfer students.



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Ohio TRANSFER TO DEGREE guarantee

Guaranteed Transfer Pathways

Statewide

Aerospace, Agricultural, or Mechanical Engineering

Associate of Science

January 4, 2021

GENERAL EDUCATION REQUIREMENTS/OHIO TRANSFER MODULE		Credit Hours
ENGLISH COMPOSITION AND ORAL COMMUNICATION:		3
* Course 1:	First Writing (TME001) course	3
MATHEMATICS, STATISTICS, AND LOGIC:		4-5
* Course 1:	Calculus I (TMM005)	4-5
ARTS AND HUMANITIES:		6
+ Course 1:	Any OTM approved Arts and Humanities course	3
+ Course 2:	Any OTM approved Arts and Humanities course	3
SOCIAL AND BEHAVIORAL SCIENCES:		6
* Course 1:	Microeconomics (OSS004)	3
Course 2:	Introduction to Psychology (OSS015)	3
NATURAL SCIENCES:		8-10
Course 1:	Calculus-based Physics I (OSC016)	4-5
Course 2:	Calculus-based Physics II (OSC017)	4-5
ADDITIONAL CREDITS:		10-11
Course 1:	Calculus II (TMM006)	3
Course 2:	Public Speaking (OCM013), Oral Communication, or Second Writing (TME002) course	3
Course 3:	General Chemistry I (OSC008)	4-5
GENERAL EDUCATION/OHIO TRANSFER MODULE TOTAL:		37-41

Advising Notes:
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(+) indicates that the courses chosen should be from two different areas within that category.
A prerequisite such as College Algebra (TMM001) may be needed for a student to reach Calculus I (TMM005).

Ohio TRANSFER TO DEGREE guarantee

Guaranteed Transfer Pathways

Statewide

Aerospace, Agricultural, or Mechanical Engineering

Associate of Science

January 4, 2021

PRE-MAJOR/BEGINNING MAJOR		Credit Hours
Course 1:	Engineering Statics (OES002)	3
Course 2:	Engineering Dynamics (OES003)	3
Course 3:	Manufacturing Processes (OET010)	3
Course 4:	CAD (OET012)	3
Course 5:	Engineering Materials (OET013)	3
PRE-MAJOR/BEGINNING MAJOR TOTAL:		15

OTHER RECOMMENDATIONS		Credit Hours
Course 1:	Calculus III (OMT018) and/or Elementary Linear Algebra (OMT019)	3-9
Course 2:	Elementary Differential Equations (OMT020)	3-4
Course 3:	Electives (if needed)	0-3
OTHER RECOMMENDATIONS TOTAL:		6-13

ASSOCIATE DEGREE	Total Credit Hours
ASSOCIATE DEGREE TOTAL:	60-65

* 6. Do you endorse the proposed Statewide Guaranteed Aerospace, Agricultural, and Mechanical Engineering Transfer Pathway?

Please note that as an Associate of Science degree, students will complete the Ohio Transfer Module prior to transfer. Recognizing that certain engineering bachelor's degree programs take native students longer than 4 semesters with full-time enrollment, the expectation for completion should be similar, although not necessarily identical, for transfer students who complete this pathway.

For community colleges, if your institution intends to offer this pathway but does NOT offer one of the courses included in the pathway, students at your institution will need to take the course at a different institution via online or a course sharing option. Also, a student would need to be able to complete your Associate of Science degree, with the inclusion of certain technical coursework (Engineering Technology TAG courses).

- ◯ Yes
- ◯ No

Comments:

7. For bachelor's degree programs: What upper level mathematics coursework do you require for aerospace, agricultural, and/or mechanical engineering?

8. **For bachelor's degree programs only:** Which of the following TAG mathematics courses would you accept in fulfillment of the upper level mathematics requirements listed in your response to Question 4, either as the exact requirement or as a substitute for the requirement? Learning outcomes for these TAG courses are available here. (Check all that apply.)

- ☐ OMT018 (Calculus III)
- ☐ OMT019 (Elementary Linear Algebra)
- ☐ OMT020 (Elementary Differential Equations)

Comments

Civil Engineering

The Engineering Panel proposes the following pathway for an Associate of Science degree leading into a bachelor's degree program in Civil Engineering:

Civil Engineering Page 1

Ohio TRANSFER TO DEGREE guarantee

Guaranteed Transfer Pathways

Statewide

Civil Engineering

Associate of Science

January 4, 2020

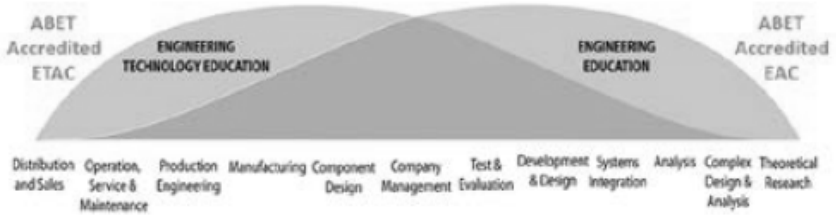
"Engineering and engineering technology are separate but closely related professional areas that differ in:

• Curricular Focus – Engineering programs often focus on theory and conceptual design, while engineering technology programs usually focus on application and implementation. Engineering programs typically require additional, higher-level mathematics, including multiple semesters of calculus and calculus-based theoretical science courses, while engineering technology programs typically focus on algebra, trigonometry, applied calculus, and other courses that are more practical than theoretical in nature.
• Career Paths – Graduates from engineering programs are called engineers and often pursue entry-level work involving conceptual design or research and development. Many continue on to graduate-level work in engineering. Graduates of four-year engineering technology programs are called technologists, while graduates of two-year engineering technology programs are called technicians. These professionals are most likely to enter positions in sectors such as construction, manufacturing, product design, testing, or technical services and sales. Those who pursue further study often consider engineering, facilities management, or business administration.

There is much overlap between the fields. Engineers may pursue MBAs and open their own consulting firms, while technologists may spend their entire careers in design capacities."

This pathway includes a combination of Associate of Science (AS) and Associate of Applied Science (AAS) coursework. It should result in students earning an AS degree. Some bachelor-degree granting programs may be competitive and admission into the program is not guaranteed. Students should check with individual institutions for their program admission requirements.

Some bachelor-degree granting institutions require additional general education courses outside of the Ohio Transfer Module and students may be required to take these courses in their junior or senior year. Additionally, students should be aware that certain Engineering programs require more than four semesters full-time to complete due to special requirements such as co-op for both transfer and non-transfer students.



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Ohio TRANSFER TO DEGREE guarantee

Guaranteed Transfer Pathways

Statewide

Civil Engineering

Associate of Science

January 4, 2021

GENERAL EDUCATION REQUIREMENTS/OHIO TRANSFER MODULE		Credit Hours
ENGLISH COMPOSITION AND ORAL COMMUNICATION:		3
* Course 1:	First Writing (TME001) course	3
MATHEMATICS, STATISTICS, AND LOGIC:		4-5
* Course 1:	Calculus I (TMM005)	4-5
ARTS AND HUMANITIES:		6
+ Course 1:	Any OTM approved Arts and Humanities course	3
+ Course 2:	Any OTM approved Arts and Humanities course	3
SOCIAL AND BEHAVIORAL SCIENCES:		6
* Course 1:	Microeconomics (OSS004)	3
Course 2:	Introduction to Psychology (OSS015)	3
NATURAL SCIENCES:		8-10
Course 1:	Calculus-based Physics I (OSC016)	4-5
Course 2:	Calculus-based Physics II (OSC017)	4-5
ADDITIONAL CREDITS:		10-11
Course 1:	Calculus II (TMM006)	3
Course 2:	Public Speaking (OCM013), Oral Communication, or Second Writing (TME002) course	3
Course 3:	General Chemistry I (OSC008)	4-5
GENERAL EDUCATION/OHIO TRANSFER MODULE TOTAL:		37-41

Advising Notes:
Where it indicates "Any OTM approved," students should work closely with their advisors.
(*) indicates that the course simultaneously satisfies general education and business core requirements.
(+) indicates that the courses chosen should be from two different areas within that category.
A prerequisite such as College Algebra (TMM001) may be needed for a student to reach Calculus I (TMM005).

Ohio TRANSFER TO DEGREE guarantee

Guaranteed Transfer Pathways

Statewide

Civil Engineering

Associate of Science

January 4, 2021

PRE-MAJOR/BEGINNING MAJOR		Credit Hours
Course 1:	Engineering Statics (OES002)	3
Course 2:	Engineering Dynamics (OES003)	3
Course 3:	Engineering Economics (OES005)	2-3
Course 4:	Engineering Statistics (OES004)	3
Course 5:	Engineering Materials (OET013)	3
Course 6:	Surveying (OET015)[1]	0-3
PRE-MAJOR/BEGINNING MAJOR TOTAL:		14-18

Advising Notes:

[1] Surveying (OET015) is not required by all Civil Engineering programs. Please check with your receiving institution to determine if this course should be included in your program of study.

OTHER RECOMMENDATIONS		Credit Hours
Course 1:	Calculus III (OMT018) or Elementary Linear Algebra (OMT019)	3-5
Course 2:	Elementary Differential Equations (OMT020)	3-4
Course 3:	Electives (if needed)	0-3
OTHER RECOMMENDATIONS TOTAL:		6-12

ASSOCIATE DEGREE	Total Credit Hours
ASSOCIATE DEGREE TOTAL:	60-65

* 9. Do you endorse the proposed Statewide Guaranteed Civil Engineering Transfer Pathway?

Please note that as an Associate of Science degree, students will complete the Ohio Transfer Module prior to transfer. Recognizing that certain engineering bachelor's degree programs take native students longer than 4 semesters with full-time enrollment, the expectation for completion should be similar, although not necessarily identical, for transfer students who complete this pathway.

For community colleges, if your institution intends to offer this pathway but does NOT offer one of the courses included in the pathway, students at your institution will need to take the course at a different institution via online or a course sharing option. Also, a student would need to be able to complete your Associate of Science degree, with the inclusion of certain technical coursework (Engineering Technology TAG courses).

- ◯ Yes
- ◯ No

Comments:

10. **For bachelor's degree programs only**: What upper level mathematics coursework do you require for civil engineering?

11. **For bachelor's degree programs only:** Which of the following TAG mathematics courses would you accept in fulfillment of the upper level mathematics requirements listed in your response to Question 4, either as the exact requirement or as a substitute for the requirement? Learning outcomes for these TAG courses are available here.
(Check all that apply.)

- ☐ OMT018 (Calculus III)
- ☐ OMT019 (Elementary Linear Algebra)
- ☐ OMT020 (Elementary Differential Equations)

Comments

Thank You

Thank you for completing the survey.